

## **REMARKS**

Applicants have amended the drawings as discussed below, amended claim 6 to correct a typographical error, and amended claims 9 and 26 to more appropriately define the present invention. Upon entry of this Amendment, claims 6 and 8-34 are pending and under current examination.

### **Regarding the Office Action:**

In the Office Action, the Examiner objected to claims 9 and 26 for informalities; rejected claims 26, 27, and 29 under 35 U.S.C. § 102(e) as being anticipated by Younan et al. (ICSE2002 Proc. 2002, Penang, Malaysia, pp. 188-190) ("Article V"); rejected claims 8-13, 15, and 22-25 under 35 U.S.C. § 102(e) as being anticipated by Younan et al. (ICSE'98 Proc., Nov. 1998, Bangi, Malaysia, pp. 1-8) ("Article U"); rejected claim 31 under 35 U.S.C. § 103(a) as being unpatentable over Article V in view of Article U; allowed claims 6 and 32-34; and objected to claims 14, 16-21, 28, and 30 as being dependent upon a rejected base claim, but allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. Applicants traverse the rejections for the following reasons.<sup>1</sup>

### **Regarding the Drawing Amendments:**

Applicants have amended the drawings to add the legend "Prior Art" to Figs. 14, 15A-15C, and 16. In addition, Applicants have filed formal drawings of all figures, including those amended, to replace the originally-filed facsimile drawings. Accordingly, Applicants file herewith ten (10) sheets of drawings, each labeled "Replacement Sheet," containing Figs. 1-16.

---

<sup>1</sup> The Office Action may contain statements characterizing the related art, case law, and claims. Regardless of whether any such statements are specifically identified herein, Applicants decline to automatically subscribe to any statements in the Office Action.

Applicants request that the replacement sheets be made of official record in the above-identified patent application. If the drawings for any reason are not in full compliance with the pertinent statutes and regulations, please so advise the undersigned.

**Regarding the Amendment to Claim 6:**

Applicants have amended claim 6 to correct a typographical error inadvertently introduced in the Amendment filed on December 17, 2004. Specifically, Applicants have replaced “chloine” with “choline.”

**Objection to Claims 9 and 26:**

The Examiner asked Applicants to clarify that the claim language “without cleavage” and “without being cleaved” means “without dicing” or “without being diced.” *See* Office Action, p. 2. The Examiner is apparently unfamiliar with the terms “cleave” and “cleavage,” or prefers use of the terms “diced” or “dicing.” Therefore, Applicants have amended claim 9 to replace “cleavage” with the equivalent term “dicing,” and claim 26 to replace “cleaved” with the equivalent term “diced,” to overcome the objection. Applicants deem the objection overcome.

**Rejection of Claims 26, 27, and 29 under 35 U.S.C. § 102(e):**

Applicants traverse the rejection of claims 26, 27, and 29 under 35 U.S.C. § 102(e) as being anticipated by Article V. Applicants respectfully disagree with the Examiner’s arguments and conclusions.

In order to properly establish that Article V anticipates Applicants’ claimed invention under 35 U.S.C. § 102, each and every element of each of the claims in issue must be found, either expressly described or under principles of inherency, in that single reference.

Furthermore, “[t]he identical invention must be shown in as complete detail as is contained in the

... claim.” See M.P.E.P. § 2131, quoting *Richardson v. Suzuki Motor Co.*, 868 F.2d 1126, 1236, 9 U.S.P.Q.2d 1913, 1920 (Fed. Cir. 1989).

Article V does not disclose at least Applicants’ claimed “wafer treatment apparatus, comprising: a first device [...] to expose a crystal surface of the semiconductor wafer *without being diced*” (claim 26). Rather, Article V discloses that “[t]wo samples were taken from the affected wafer as the good site [...] and the bad site” (page 189). This shows that the affected wafer was cleaved (diced) to remove portions for separate failure analysis testing.

Further, Article V also does not disclose “a second device” (claim 26). There is nothing in Article V’s disclosure that references a “wafer treatment apparatus, comprising: ... a second device” (claim 26). It appears that Article V discloses that the authors performed the failure analysis by “performing *studies*” (page 189, emphasis added), but there is no disclosure of any *devices* as part of a wafer treatment apparatus.

The Examiner did allege that “[n]ote; the second device may mean any additional test structure (ie. valve), test component (etchant) or test gas” (Office Action, p. 3). Applicants disagree with the Examiner’s characterization. A “valve,” for example, *cannot* “remove with a chemical solution a film of a semiconductor wafer which may have a crystal defect” (claim 26). Further, an etchant or a test gas does not constitute a “test *structure*,” and does not constitute the claimed “first device” or “second device.” Thus, Article V does not anticipate Applicants’ independent claim 26.

Independent claim 26 is therefore allowable, and dependent claims 27 and 29 are also allowable at least by virtue of their respective dependence from allowable base claim 26. Therefore, the improper 35 U.S.C. § 102(e) rejection of claims 26, 27, and 29 should be withdrawn.

**Rejection of Claims 8-13, 15, and 22-25 under 35 U.S.C. § 102(e):**

Applicants traverse the rejection of claims 8-13, 15, and 22-25 under 35 U.S.C. § 102(e) as being anticipated by Article U. Applicants respectfully disagree with the Examiner's arguments and conclusions.

**Independent Claim 8**

Article U does not disclose at least Applicants' claimed "treating the semiconductor wafer in a first solution including at least one of NH<sub>4</sub>F and HF whose concentration is equal to or more than 33% and less than 49%" (claim 8). Rather, as Applicants have previously stated (Amendment filed on December 17, 2004, p. 13), Article U discloses "HF(49%) deprocessing," at page 1, par. 2. Claim 8 clearly recites using HF with a concentration "less than 49%." In response, the Examiner alleged that "no solution is exactly 49% [HF], and may include a solution with a little more (49.005%) or a "little less" (48.995%) HF" (Office Action, p. 4).

The Examiner's arguments for upholding the 35 U.S.C. § 102(e) rejection on this basis are improper. As M.P.E.P. § 2131.03(III) states,

III. PRIOR ART WHICH TEACHES A VALUE OR RANGE THAT IS VERY CLOSE TO, BUT DOES NOT OVERLAP OR TOUCH, THE CLAIMED RANGE DOES NOT ANTICIPATE THE CLAIMED RANGE "[A]nticipation under § 102 can be found only when the reference discloses exactly what is claimed and that where there are differences between the reference disclosure and the claim, the rejection must be based on § 103 which takes differences into account." *Titanium Metals Corp. v. Banner*, 778 F.2d 775, 227 USPQ 773 (Fed. Cir. 1985). M.P.E.P. § 2131.03(III), 8th Ed., Rev. 3 (August 2005), p. 2100-80 (emphasis added).

The M.P.E.P. demonstrates that the Examiner's arguments in support of the 35 U.S.C. § 102(e) rejection are improper. Whether or not a solution may contain a "little more" or a "little less" HF is not germane to the inquiry under 35 U.S.C. § 102(e).

Furthermore, to the extent that the Examiner decided to approximate Article U's solution as including a "little more" or a "little less" than 49% HF, which is not disclosed in Article U, Applicants dispute the Examiner's presumed taking of Official Notice as being improperly presented. The Examiner's general allegation that "no solution is exactly 49%," for example, is not sufficient to support taking of Official Notice. Applicants respectfully remind the Examiner that

the basis for [the Examiner's] reasoning must be set forth explicitly. The examiner must provide specific factual findings predicated on sound technical and scientific reasoning to support his or her conclusion of common knowledge. See [In re Soli, 317 F.2d 941, 137 U.S.P.Q. 797 (CCPA 1963)], 317 F.2d at 946, 37 USPQ at 801; [In re Chevenard, 139 F.2d 711, 60 U.S.P.Q. 239 (CCPA 1943)], 139 F.2d at 713, 60 USPQ at 241. The applicant should be presented with the explicit basis on which the examiner regards the matter as subject to official notice and be allowed to challenge the assertion in the next reply after the Office action in which the common knowledge statement was made. M.P.E.P. § 2144.03(B), 8th Ed., Rev. 3 (August 2005), p. 2100-143.

Therefore, the Examiner's presumed Official Notice is not sufficient to establish anticipation of Applicants' independent claim 8.

Moreover, to the extent that the Examiner may be alternatively relying on an inherency argument to support his allegation that "no solution is exactly 49% [HF], and may include a solution with a little more (49.005%) or a "little less" (48.995%) HF" (Office Action, p. 4), the allegation, if based on inherency, is specious and without merit. The Examiner has not established that Article U discloses each and every element of Applicants' independent claim 8, either explicitly or under the principles of inherency. As M.P.E.P. § 2112 makes clear:

To establish inherency, the extrinsic evidence 'must make clear that the missing descriptive matter is *necessarily present in the thing described in the reference*, and that it would be so recognized by persons of ordinary skill. *Inherency, however, may not be established by probabilities or possibilities.* The mere fact that a certain thing may result from a given set of circumstances is not sufficient'" (M.P.E.P. § 2112, 8th Ed., Rev. 3. (August 2005), p. 2100-57, emphasis added, internal citations omitted).

In addition, M.P.E.P. § 2112 states: “[i]n relying upon the theory of inherency, *the examiner must provide a basis in fact and/or technical reasoning to reasonably support the determination that the allegedly inherent characteristic necessarily flows from the teachings of the applied prior art*” (*Id.*, emphasis added, internal citations omitted).

The Examiner has not provided *any* evidence from Article U, or *any* recourse to extrinsic evidence, to establish that the subject matter of independent claim 8 is *necessarily present* in Article U. Further, the Examiner failed to present any factual basis and/or technical reasoning to demonstrate inherency. Consequently, the Examiner cannot infer that the claimed subject matter is inherently disclosed by Article U, on basis of the allegation that “no solution is exactly 49%.”

Thus, Article U does not anticipate Applicants’ independent claim 8.

*Independent Claim 9*

Independent claim 9 recites, in part, “selectively removing a surface layer of the semiconductor wafer by selective etching *without dicing* to bring the crystal defect into view” (emphasis added). The Examiner ignored this portion of claim 9 in the rejection. *See* Office Action, p. 4. Article U discloses that “all samples were cut into a quarter wafer using a diamond scribe, or cut the sample as requested,” (page 1, col. 2) prior to any etching. Article U therefore teaches cleaving/dicing the samples prior to etching, which is contrary to Applicants’ claim 9.

In addition, Applicants submit that the previous arguments of record (Amendment filed December 17, 2004, page 13) have demonstrated that the Examiner has not established anticipation of independent claim 9.

Thus, Article U does not anticipate Applicants’ independent claim 9.

Independent claim 23

Independent claim 23 recites, in part, “quantitatively evaluating the crystal defect *over the entire semiconductor wafer*” (emphasis added). The Examiner also ignored this portion of claim 9 in the rejection. See Office Action, p. 4. Article U discloses cleaving the samples prior to selective etching. Since the samples are cleaved from a test wafer, Article U cannot disclose evaluating the crystal defect over the *entire* wafer. Therefore, Article U does not teach the elements of Applicants’ claim 23.

In addition, Applicants submit that the previous reasoning of record (Amendment filed December 17, 2004, page 13) has demonstrated that the Examiner has not established anticipation of independent claim 23.

Conclusion

Independent claims 8, 9, and 23 are therefore allowable, and dependent claims 10-13, 15, 22, 24, and 25 are also allowable at least by virtue of their respective dependence from allowable base claim 9 or 23. Therefore, the improper 35 U.S.C. § 102(e) rejection of claims 8-13, 15, and 22-25 should be withdrawn.

**Rejection of Claim 31 under 35 U.S.C. § 103(a):**

Applicants traverse the rejection of claim 31 under 35 U.S.C. § 103(a) as being unpatentable over Article V in view of Article U. Applicants respectfully disagree with the Examiner’s arguments and conclusions. A *prima facie* case of obviousness has not been established.

To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The

teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991). M.P.E.P. § 2142, 8th Ed., Rev. 3 (August 2005), p. 2100-134.

A *prima facie* case of obviousness has not been established because, among other things, neither Article V nor Article U, nor their combination, teaches or suggests each and every element of Applicants' claims.

Applicants have already demonstrated previously herein that Article V does not teach or suggest all the elements of independent claim 26. In addition, the Examiner admitted that Article V "fails to [teach] an ultrasonic wave generator to apply to the semiconductor" (Office Action, p. 5).

The Examiner's application of Article U, however, does not cure the deficiencies of Article V already discussed. That is, Article U also does not teach or suggest at least the claimed "wafer treatment apparatus, comprising: a first device [...] to expose a crystal surface of the semiconductor wafer *without being diced*" (claim 26), or "a second device" (claim 26). Moreover, Applicants point out that neither Article V nor Article U teaches or suggests the use of ultrasonic waves, or a device to remove particles by ultrasonic waves, as required by claim 31.

Thus, even if Article U was combined with Article V as the Examiner suggests, neither teaches or suggests all elements recited in independent claim 26, and required by dependent claim 31. Therefore, the Examiner's application of Article U does not establish a *prima facie* case of obviousness over Applicants' dependent claim 31.

For at least these reasons, the Examiner's rejection is improper and without merit. Accordingly, the Examiner has failed to establish *prima facie* obviousness of dependent claim 31. Dependent claim 31 is also allowable at least by virtue of its dependence from allowable base claim 26. The improper 35 U.S.C. § 103(a) rejection should be withdrawn.



**Improper Citations to Article U in the Office Action:**

Applicants point out that many of the Examiner's citations to Article U do not actually correspond to the reference. Applicants respectfully remind the Examiner that

In rejecting claims for want of novelty or for obviousness, the examiner must cite the best references at his or her command. When a reference is complex or shows or describes inventions other than that claimed by the applicant, *the particular part relied on must be designated as nearly as practicable. The pertinence of each reference, if not apparent, must be clearly explained* and each rejected claim specified. 37 C.F.R. §1.1.04(c)(2), M.P.E.P. § 707, emphasis added.

In the 35 U.S.C. § 103(a) rejection of claim 31, for example, the Examiner cited Article U at "pg. 21 col. 2 last para" and "pg. 21 last para. - pg. 22 1<sup>st</sup> para" (Office Action, p. 5). However, Article U does not include a 'page 31,' and only includes pages 1-8. Likewise, in the 35 U.S.C. § 102(e) rejection of claims 8-13, 15, and 22-25, the Examiner cited Article U at "pg. 22 col. 2 para. 2-5," "pg. 20 Col. 2 para. 1-3," and "pg. 21 col. 2 last para" (Office Action, p. 4). Article U does not include a 'page 20,' '21,' or '22.'

If the Examiner maintains any of the rejections after consideration of the reasoning presented herein, Applicants request the Examiner provide the correct citations to the applied references.

**Allowable Subject Matter:**

Applicants acknowledge with appreciation the Examiner's indication that claims 6 and 32-34 are allowed.

**Objected-to Claims 2, 3, 9, and 10:**

Since Applicants have demonstrated above that independent claims 9 and 26 are allowable, dependent claims 14, 16-21, 28, and 30 are also allowable at least by virtue of their

respective dependence from allowable base claim 9 or 26. Applicants request withdrawal of the objection.

**Conclusion:**

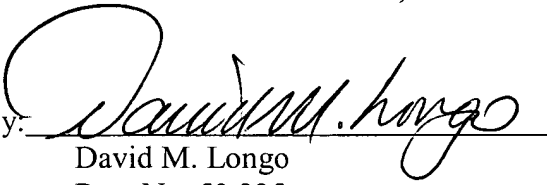
In view of the foregoing, Applicants request reconsideration of the application and withdrawal of the rejections. Pending claims 6 and 8-34 are in condition for allowance, and Applicants request a favorable action.

If there are any remaining issues or misunderstandings, Applicants request the Examiner telephone the undersigned representative to discuss them.

Please grant any extensions of time required to enter this response and charge any additional required fees to our deposit account 06-0916.

Respectfully submitted,

FINNEGAN, HENDERSON, FARABOW,  
GARRETT & DUNNER, L.L.P.

By:   
David M. Longo  
Reg. No. 53,235

Dated: December 21, 2005

/direct telephone: (202) 408-4489/